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WEST EUROPE REPORT SCIENCE AND TECHNOLOGY

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BIOTECHNOLOGY

BRIEFS

BIOLOGICAL RESEARCH INCREASES--In 1982 the German Research Society will establish at the Technical University of Munich two new special research areas: "Biological and Technical Fundamentals of Bioconversion," and "Primary Processes of Bacterial Photosynthesis." Of all German technical universities, the Technical University of Munich--alongside the Technical University of Aachen--houses the largest number of special research areas, ten to be exact. They are financed 75 percent by the federal government and 25 percent by the states. The German Research Society determines the topics according to current research requirements and awards the studies to the centers with the highest qualifications. Bioconversion is any material conversion in nature which is aided by enzymatic catalysis. The research project will bring together scientists from the fields of biochemistry, cell biology, plant physiology, microbiology and organic chemistry; and it will also bring in control system engineers. The project involves research on the synthesis of natural materials and, when possible, the technical imitation of such processes. Photosynthesis is the process by which plants and bacteria build energetic chemical compounds from water and carbon dioxide using light as a source of energy. It proceeds in many small steps under the influence of electrical fields. Understanding the total process could lead to the development of molecular structures which, in technical application, would efficiently employ light in the construction of energy-rich chemical materials. The goal is the conservation of solar energy; the key is the understanding of the method by which plants and bacteria transform light into electrical energy for the development of fields. [Text] [Munich SUEDEDEUTSCHE ZEITUNG in German 30 Nov 81 p 6] 9160

CSO: 3102/99

ELECTRONICS

FIRST FRENCH EQUIPMENT FOR REACTIVE ION ETCHING

Paris ELECTRONIQUE ACTUALITES in French 4 Dec 81 pp 1, 10

[Article by JPDM]

[Text] The Vacuum and Mechanics Division of the CIT [International Telephone Company] - ALCATEL [Alsation Company for Atomic, Telecommunications and Electronic Construction] announced officially on 26 November its first dry-etching machine for integrated circuits, the GIR 200, which is also the first European etching machine for high-density integrated circuits.

This machine, which operates on a slice-by-slice basis, is quite exceptional, in the sense that it provides in a single enclosure two processes and two reactors. Its output averages 30 slices an hour and its price is relatively low (Fr 800,000).

CIT-ALCATEL currently has an annual turnover of Fr 14 million in the field of thin-layer equipment (deposition by evaporation or spraying and etching processes), which should go up to Fr 22-25 million in 1982, and reach Fr 60-70 million around 1985, owing essentially to its etching product line. To achieve this rate of growth, the Division will put into operation a new 2,500-m² plant, now under construction at Annecy and scheduled to be completed in June 1982, specializing thin-layer equipment.

A Combining of Extraordinary Expertises

Down to image sizes of around 2.5 microns, the principal limitation on further integrated-circuit image-size reductions had been the masking operation. Now that the industry seeks to come down to the 2-micron and even the 1.5-micron levels, it is the etching operation that limits production yields, since masking has recently become industrialized thanks to repetitive photoreduction machines and the very imminent high-definition 1/1 projection machines.

As regards etching, the recent RIE [Reactive Ion Etching] machines have brought about a current improvement in results. But planar plasma machines are better suited to certain materials, and tubular plasma machines, which are older and more economical, suffice for simple operations of the dipping, washing and fettling type.

It is within this frame of reference that MHS [expansion unknown] contacted CIT-ALCATEL about the beginning of 1980 to examine the possibilities of developing jointly a machine capable of high yields in this domain. The prime requirements for this undertaking were quickly brought together. CIT-ALCATEL brought to the operation its know-how in mechanics, vacuum deposition and vacuum pumps; MHS its industrial experience, highly essential especially with respect to drawing up the required set of specifications; the LETI [Electronic and Technology Laboratory] its technological know-how; and lastly the DAII [Directorate of Industrial and International Affairs] its financial support. A year and a half later, the first production model was unveiled. Judging from its characteristics, it would appear to be one of the world's highest-performance machines in this domain: It features slice-by-slice- rather than batch-processing, enabling adjustment of etchings and improved production yields; availability of RIE and/or planar plasma etching to suit the etching process to the problems and materials involved; two separate reactors mounted in tandem, enabling, for example, one of the reactors to perform high-speed plasma etching operations while the other performs selective ion-etching finishing operations; nonuniformity of etching limited to 3 percent in the bottom slice; 20-slice, 3" to 5", cassette loading/unloading; and automatic or manual control by 6809 microprocessor with storage of parameters and integrated display. The circular (rather than in-line) structure adopted also avoids the presence of dual gates and simplifies the mechanical elements of control. CIT-ALCATEL did not adopt the modular structure initially (which would have increased outputs several-fold), so as to come up with a simple and relatively economical machine. The first machines will be delivered by CIT-ALCATEL beginning in April-May, six of which are now about to go into production. In 1982, delivery times should be around 5-6 months.

A Market Growth Rate of Over 30 Percent Per Annum

As we have seen, development of the GIR 200 has taken place under very favorable technical conditions. The same will be true, in principle, of its marketing, since CIT-ALCATEL already enjoys a good reputation among the world's manufacturers of semiconductors thanks to its line of vacuum pumps (30 percent of its export production going to the United States). It is not surprising therefore that CIT-ALCATEL should now be investing in the domain the company calls thin-layer equipment, the more so since the world market for etching equipment is expected to grow from \$90 million in 1980 to \$335 million in 1984, the growth rate foreseen for Western Europe alone being 57 percent per annum in terms of value (\$30 million in 1984). The new plant will enable a production of 10-15 machines per month by 1983, most of this capacity being allocable to the GIR 200. The company is moreover working now on a batch-processing, automatic loading machine capable of processing 150 slices per hour. It should be available in 1983.

9399

CSO: 3102/101

INDUSTRIAL TECHNOLOGY

THREE-YEAR GOVERNMENT PROGRAM TO AID MACHINE TOOL INDUSTRY

Paris ELECTRONIQUE ACTUALITES in French 11 Dec 81 p 4

[Text] The government has decided to provide major funding to pull the French machine tool industry up out of its slump under a 3-year program that will total Fr 2.3 billion. The plan features three facets: reorganization of the sector, technological innovation, and manipulation of supply and demand in favor of state-of-the-art equipment and accessories.

The plan has not actually been named an MO [Machine Tool] plan, but that is exactly what it is, and its objectives are very specific: They are, no less, to radically overturn all the trends that are contributing to the decline of the sector. Production and employment in this sector have been going down over the past 10 years. Under this plan, production is to double between now and 1985 and grow at a rate of 40 percent a year.

The trade balance in this sector is a deficit (-Fr 1 billion in 1981). Imports are to be reduced by half and exports are to be increased by 60 percent. Its technological gap is large (less than 10,000 MOCN's [Numerically Controlled Machine Tools] installed). The plan calls for the production 5,000 MOCN's by 1985.

Reorganization

To this effect, a vast reorganization plan will be put into operation to mobilize this fragmented sector around three principal product lines. The first of these will be a "mail-order" line involving a joint effort between Hure Graffenstaden (CIT [International Telephone Company] - ALCATEL [Alsation Company for Atomic, Telecommunications and Electronics Construction]) and Ernault-Somua. As regards the other two lines--heavy machines (TMI [expansion unknown] - Berthiez et Line) and special-purpose machines (possibly Renault, who however does not appear to be in a hurry to take on the role of rescuer)--talks are less advanced. There is no dearth of problems to be resolved, particularly as to the forms such joint efforts are to take, but matters may be expected to move forward quickly and the president of the Republic has asked Minister of Industry Dreyfus to present a plan by mid-January.

Some 15 developmental contracts are being negotiated on the basis of precise commitments regarding specialized products, which should eliminate excessive competitive duplication. Several contracts concern basic components, motors (with

Leroy-Somer, CEM [Electromechanical Equipment Company]), control electronics, speed regulators and changers (with Telemecanique and CEM), and above all numeric controls (with NUM [expansion unknown]).

State of the Art and Innovation

The second facet of the government's plan, research and innovation, will be implemented by way of collective contracts totaling Fr 200 million involving major state-owned and professional organizations (CERMO [Center for Research and Study of Machine Tools], ENSAM [College of Trade and Industry], ADEPA [Association for the Development of Automated Production], and above all CETIM [Technical Center for Mechanical Industries]. The sum to be allocated to private research will about equal that for the foregoing developmental contracts. The Ministry of Research will be associated with the program through regional offices. A senior technician certification will be instituted by the Ministry of Education in informatics and industrial electronics.

The third facet places emphasis on the development of state-of-the-art robotics and flexible-shop equipment. The developmental funding to be dedicated to robotics (Fr 1.2 billion in 1981) is to be "substantially increased." Supply factors as well as demand factors will be acted upon, and the state plans to set the example by increasing its government orders, which are at present virtually nil (Fr 50 million), to Fr 1.2 billion over a period of 3 years.

The MECA [Advanced-Design Machines and Equipment] procedure being implemented by the ADEPA will also receive a strong impetus, while a purchase-lease company will be formed for high-technology equipment, including robotics.

Many measures adopted remain to be detailed, but it is evident at this point that the measures already adopted with respect to state-of-the-art equipment and high-added-value machines should translate very positively for the electronics industry--first and foremost by vitalizing a sector in which the French market gap has constantly presented an obstacle to French industrial electronics, which is not in the least lacking in technical potential (in the fields of numeric control, robotics, and motor control, for example); and secondly, because the role itself of electronics in machine tools is quite obviously being called upon to take on rapidly increasing importance.

SCIENCE POLICY

DISCUSSION BEGINS ON LEGISLATION TO IMPLEMENT R & D INCREASES

Plans Outlined

Paris LE MONDE in French 25 Dec 81 p 8

[Article by J.-F. A.]

[Text] The Wednesday 23 December meeting of the Council of Ministers began discussions with an "initial exchange of views on the main points" of the draft legislation pertaining to research and technological developmental orientation and programing, which is to be submitted to Parliament in the spring (see communique p 8 [below]). The final meeting on this matter will be held on 6 January.

This legislation must specifically provide the budgetary funds needed to achieve the official objective whereby R & D expenditures will attain 2.5 percent of the GDP [Gross Domestic Product] by 1985. This objective depends, according to an official report, upon the implementation of a very substantial funding effort in 1983.

During the preparation of the "interim plan," a group of government experts led by Mr Hubert Curien, president of the CNES [National Center for Space Studies], examined the question of what means--especially budgetary means--would have to be deployed over the next several years to increase the national R & D expenditure to 2.5 percent of the GDP by 1985 (from 1.83 percent in 1980).

The findings of this group, which are the subject of a report that has just been published by the French Documentation Service, are subtended throughout by two concepts: a) The operating facilities of the state-owned basic research laboratories must be brought up to an indispensable level; and b) An industrial research and innovational incentive policy must be implemented to vitalize industry and confer on state interventions "a true multiplicative character."

Such a policy, according to the group's findings, must provide for a very rapid evolution, during the period 1982-1983, of the financing and implementation of public-sector research. They also recommend that development of basic research be continued while at the same time enhancing the incentive toward applied research, "the bottleneck of public research," and instituting a number of technological programs in new domains such as robotics, the biotechnologies or scientific

management of energy utilization and new energy technologies. Such orientations, which in some cases are already in place, will require, together with the "opening up of a greater public environmental research effort," a number of measures designed to increase by 6.5 percent in terms of volume the annual appropriations for personnel; increase by 50 percent over a period of 2 years the operations credits (namely, direct expenditures for research); double during the same period the credits allocated to the support and encouragement of research operations conducted jointly with industry; and implement the list of major equipment requirements drawn up by the Teillac report. Thus proposed are the creation of a vast research library in the human and social sciences, the building of a European transonic cryogenic wind tunnel, and the design, then the construction, of a large-scale French computer.

The situation of French industrial research is a matter of serious concern, according to the findings of the group. With a commitment of Fr 30 billion to this sector--1.1 percent of the GDP--France's effort will rank below that of the United States (1.6 percent, the FRG (1.4 percent), Great Britain (1.3 percent) and Japan (1.3 percent). From this, "It is clear that the objective of committing 2.5 percent of the GDP to R & D expenditures by 1985 will not be attained satisfactorily unless French industry takes an active part in this effort (...)."

79.7 Billion by 1985

The reporting group deems that the effort to be deployed during the interim plan must center mainly on the nationalized enterprises, collective research (technical centers) and "associative research" by way of which enterprises and laboratories cooperate. More generally, it stresses that a substantial financial effort will have to be deployed throughout the period to June 1985, and an exceptional one in 1983. "We are aware," it states, "of the difficulties the budgetary actualization of this planning proposal may entail. But it is only at that price that a real improvement in the situation can be achieved and that the objective set by the government can be attained."

Hypothetically, it finds that a low annual economic growth rate of 3 percent over a period of 5 years would result in a national expenditure of Fr 79.9 billion (under 1980 conditions) in 1985, Fr 29.6 billion of which would be industrially financed (versus Fr 21.7 billion in 1980), and Fr 50.1 billion would be government financed (versus Fr 28.8 billion in 1980). Within these terms of reference, the national R & D expenditure in 1983 will require a substantial increase to Fr 65.2 billion. These goals are far from being to the liking, in particular, of the budget management office, which, while recognizing the validity of these findings, expresses serious reservations as to the scale of effort the state budget can accommodate and the unbalance it would induce, particularly in 1983.

Disagreements Persist

Paris LE MONDE in French 25 Dec 81 p 8

[Article by Xavier Weeger]

[Text] The major provisions of the research program legislation will not be known

until early January, only 1 week from the "national proceedings" that, in the presence of the president of the Republic and the prime minister, will conclude the "national symposium."

Mr Chevenement knows very well what he would like to see provided by this legislation. But his views in this regard are far from being unanimous: An inter-ministerial meeting on Tuesday evening 22 December at Matignon left no doubt as to the disagreements that persist between Mr Chevenement and certain of his colleagues and that are certain to have been included in the report on the discussion of those views that was submitted to the meeting of the Council of Ministers on 23 December.

These disagreements seem to center particularly on two issues: The Ministry recommends, first of all, that the main points of the terms and conditions of employment of research personnel be written into the legislation, rather for political, indeed psychological, reasons than for juridical reasons. The position being taken in this regard by Mr Chevenement's office, which is that this personnel should finally see it recognized that research is an "occupation" and should have more guaranties than are provided by their present status as contract employees, is apparently not in the least shared by the Ministry of the Public Function and Administrative Reforms.

But--as can be easily imagined--budgetary problems are the main stumbling block. Mr Chevenement wants the legislation to include a minimum number of explicitly funded objectives, fixing particularly the overall sums and principal allocations of the research budget for the 5 years the program legislation is to cover. The Ministry, not without some good reasons, makes this a matter of principle... which the Finance officials do not want to hear about discussed.

The interministerial debate has, of course, only started. Not until after 6 January will things really begin to happen; but then, the decisions will have to be rapidly arrived at--by the first of February at the latest--if the timetable that has been set is to be met. "This promises us 1 month--January--of drawn daggers," say some ministry officials.

9238

CSO: 3102/102

SCIENCE POLICY

STATE TO AID RESEARCH IN MICROELECTRONICS, BIOTECHNOLOGY

Frankfurt/Main FRANKFURTER RUNDSCHAU in German 5 Dec 81 p 13

[Text] The German federal government will help German microelectronics make a decisive breakthrough. Microelectronics, like communication technology and biotechnology, will constitute one of the focal points of Bonn research aid during the next few years. This was announced by Research Minister Andreas von Buelow. An allocation of DM 236 million is planned for coming years in the area of microelectronics, including special funds in the amount of DM 100 million designated for support of product developments. In the face of powerful Japanese and American development efforts in this field, Buelow sounded the alarm that German exports of technology intensive goods has stagnated in recent years while the import of such products has risen. With the new special program in microelectronics, which will receive DM 100 million per year for 3 years, competitive capability will be strengthened and jobs will be stabilized in the long term. Ministry experts point out, for example, that new machine tools will have a chance only if they have microprocessor controls; this is also true for new transmission technology in the data and communication fields. In the area of new technologies, the research minister is pushing not only for stronger cooperation between the firms concerned but also for greater involvement of the government and labor unions. The research ministry will increase the outlay for the biological sciences by 28 percent from DM 43 million (1981) to DM 55 million (1982). Buelow noted in this regard that biotechnology, including comprehensive work in the field of genetic research, could be for the 1990's what microelectronics is for the 1980's. Important leaps in knowledge have opened enormous longterm potentials for many-faceted applications in medicine, pharmacology, agriculture, chemistry, raw material production and environmental protection. As an application of biotechnology, consideration is being given to replacing animal experiments, which are encountering ever increasing criticism, by new methods from the area of cell cultures, for instance. Also belonging to biotechnology is research in the artificial production of important therapeutic materials like interferon which is being considered for cancer treatment. Buelow stressed that biological-science research will be brought together under a program of its own and supported on a broad basis. Presently, an intensive exchange of ideas is underway with the chemical and pharmaceutical industries concerning additional support measures.

9160

CSO: 3102/99

TRANSPORTATION

SAAB CONSIDERS CONTRACTING PART OF BAE 146 WORK TO FINLAND

Stockholm NY TEKNIK in Swedish 5 Nov 81 p 3

[Article by Sven-Olof Carlsson and Sverker Nyman]

[Text] Valmet hopes to take over about one third of Saab-Scania's production for the British Bae-146 feeder liner. Negotiations are underway and the Finnish side says that the chances of an agreement are about even. Valmet also stated that discussions are underway on Finnish subcontracts for other Saab projects as well, although Saab will not confirm this at present.

It is the production of rudders and ailerons that Valmet in Kuorevesi hopes to take over from Saab-Scania's aviation division in Linkoping, head of Saab-Scania's aircraft factory Juhani Makinen told NY TEKNIK. Eight metal workers from Valmet already are working in Linkoping to learn the production process.

If the deal is made Saab-Scania will give up production of the Bae-146 only. Saab is the legally responsible subcontractor. Saab participated in the design of the tail section (stabilizer and rudders) and spoilers. That occupied about 80 design engineers for almost 1 year and the work was completed some time ago.

This production corresponds to about 5 percent of the airplane's total value of about 110 million kronor. British manufacturers from British Aerospace are responsible for 55 percent of the plane's value and the United States is responsible for 40 percent (motors and wings).

Full-Scale Production

So far, British Aerospace has sold 13 planes to domestic American companies and has options on about 10 more planes, valued at 1.5 billion kronor. Full-scale production with three or four planes per month would employ 7,000 to 8,000 workers in Great Britain, 4,000 in the United States, and about 200 in Sweden at Saab. A subcontract to Valmet could mean as many as one third the number of jobs made available in Linkoping.

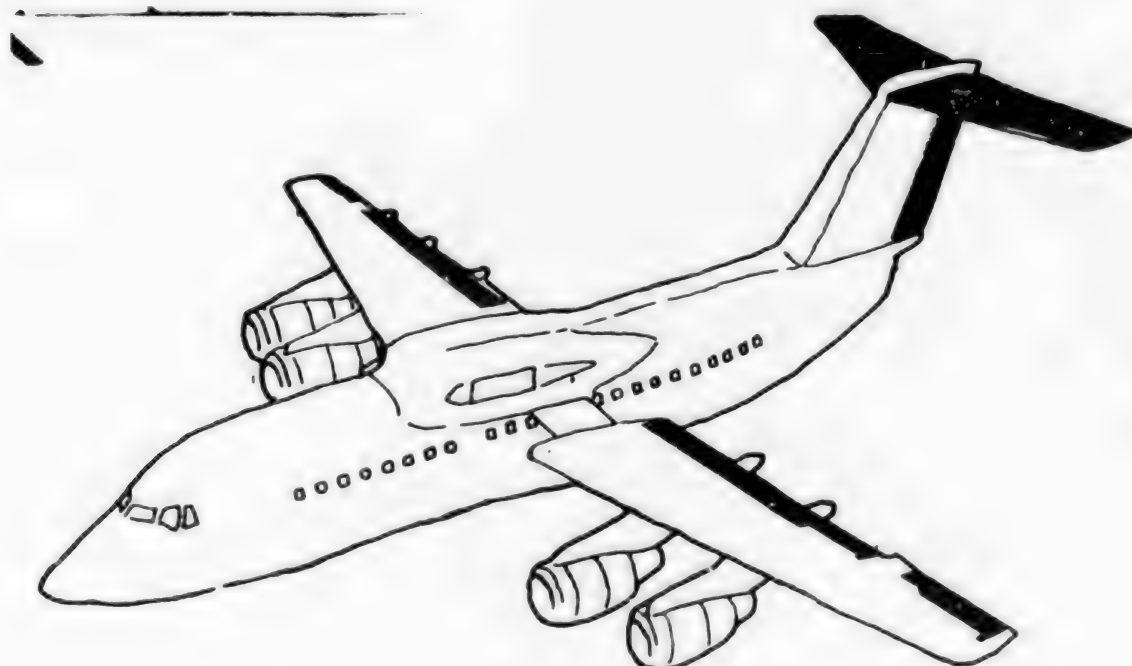
For Saab a transfer of production to Valmet would mean that more workers could be used for the Fairchild SF 340 project, the Viggen fighter, and production of the DC-9 Super 80, as well as assistance to a nearby future subcontractor. Saab and Valmet also have worked together for a long time to manufacture automobiles.

The problem for Valmet's aircraft factory in Kuorevesi is to obtain new orders by any means. By next year the factory will have delivered all 30 Vinka training planes ordered by the Finnish air force. Valmet developed this single-engine propeller-driven plane itself. This plane is a successor of a trainer the Finnish air force purchased from Saab in Sweden.

Empty Order Books

When Vinka production is complete only licensed assembly of the British Hawk will remain. The Hawk is a combined advanced trainer and light attack plane, most comparable to the older Saab 105. Hawk deliveries will end in 1985 and at that time Valmet's order books will be empty.

"We are also negotiating with the British for partial deliveries for British planes. We may also resume negotiations with the Soviet Union on partial deliveries for the MI-8 helicopter which now is used by Finnish border guards," Juhari Makinen said.



Valmet's aircraft factory in Finland hopes to take over the production of rudders and ailerons for the Bae-146 feeder-liner from Saab-Scania. Saab's overall share in the British four-engined jet plane also includes stabilizers and spoilers.

9336

CSO: 3102/95

TRANSPORTATION

VIEWS DIFFER ON CYLINDER DEACTIVATION FOR FUEL SAVING

Stockholm NY TEKNIK in Swedish 19 Nov 81 p 17

[Article by Jan Melin]

[Text] An automobile engine that runs on only two of four cylinders when low power is required can reduce gasoline consumption by up to 35 percent. This was reported by Alfa-Romeo, which is now testing such engines.

One system for reducing gasoline consumption in automobile engines is to allow the engine to operate on a portion of its cylinders when low power is required. Alfa-Romeo is now testing such an engine. It is an ordinary 2.0 liter four-cylinder engine that has been installed in ten taxis in Milan.

Each of the cylinders in the engine has separate fuel injection. A micro-processor measures and controls the fuel injection, the injection angle, the motor speed, and the radiator and air temperatures.

During low power output the processor deactivates two of the cylinders and allows the remaining two cylinders to operate. So that the wear will not be uneven, the processor changes cylinder pairs approximately every minute.

Poorer Response

The difference between driving on two cylinders and four is that with two cylinders the engine does not respond as well to the gas pedal, about like when the timing is slightly off. This was stated by designers at Alfa-Romeo.

It has been reported in Milan that in the present tests gasoline savings of 35 percent for city driving and 12 percent on the highway at speeds up to 90 km/h have been achieved.

General Motors has tested a similar system. Their tests were made on six and eight cylinder engines. One difference from the Alfa-Romeo tests was that General Motors did not alternate cylinder pairs, but allowed the same pair of cylinders to be deactivated during periods of low power output.

Electronics--Overconfidence

Saab's passenger car division in Nykoping said it is not interested in this technology.

"Perhaps there is some overconfidence in automobile electronics today," Hans Thornkvist of Saab said.

"To be sure, there are some possibilities for development in the area of electronics, but we are interested in developing the mechanical aspects, such as improved tires and reduced friction in the drive system."

Volvo in Goteborg is more secretive about its views on the Alfa-Romeo and General Motors tests. Volvo will not say whether it has tested, will test, or is now testing engines in which the cylinders are deactivated during periods of low power output.

CAPTION

The difference between driving on two cylinders and four is that with two cylinders the engine does not respond as well to the gas pedal, about like when the timing is slightly off.

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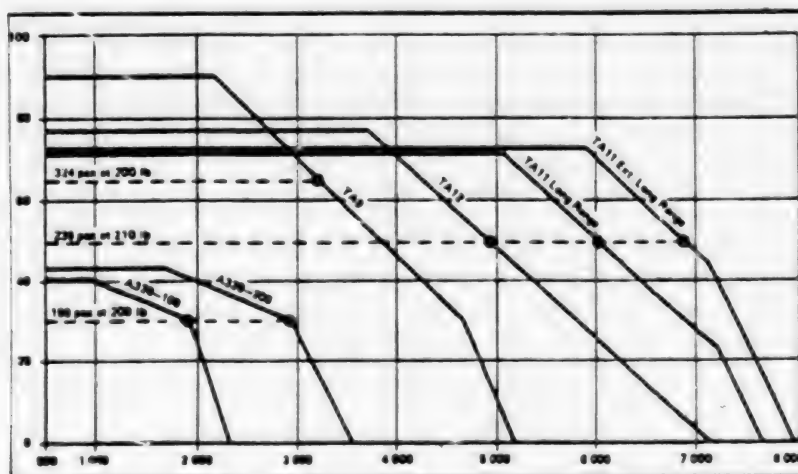
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TRANSPORTATION

AIRBUS INDUSTRIE PLANS EXPANDED LINE OF PRODUCTS

Paris AVIATION MAGAZINE INTERNATIONAL in French 1-14 Jan 82 pp 26-27

[Text] Toulouse--At the very moment when Lockheed announced stopping the production of the "Tristar," Airbus Industrie submitted its future plans at Toulouse. Without equivocation, the European producer has decided to develop a line which covers all the commercial market from the short-medium range liner with 150 seats to the long distance liner with 4 jet engines. The order of priorities is still somewhat vague, but it is gradually becoming clear from the various statements of group leaders.



From the A-320, a short-range liner to the TA-11, a very long distance liner Airbus Industries intends to cover in the future the essential needs of the civilian market, as these diagrams mass/distance coverable indicate.

We report first what has been found out. The "small" Airbus, the A-310 is about to leave the assembly shop in Toulouse. The basic plane, the A-300B will be replaced beginning in 1984 with a new version, the A-300-600 the first models of which will be delivered to companies beginning in October 1984 (nevertheless a dozen standard A-300B remain to be sold).

Then, which is very probable, it is a question of starting a short-medium range liner with 150 seats, the A-320 (AMI [expansion unknown] No 816), delayed to obtain starting orders. Air France has already decided on it, a decision is expected from Delta Airlines in the first quarter of 1982. But if the American Company does not choose the European plane, Airbus Industries is ready to go forward with non-American orders, since from its point of view, the market outside the United States alone is important enough to make its operation profitable.

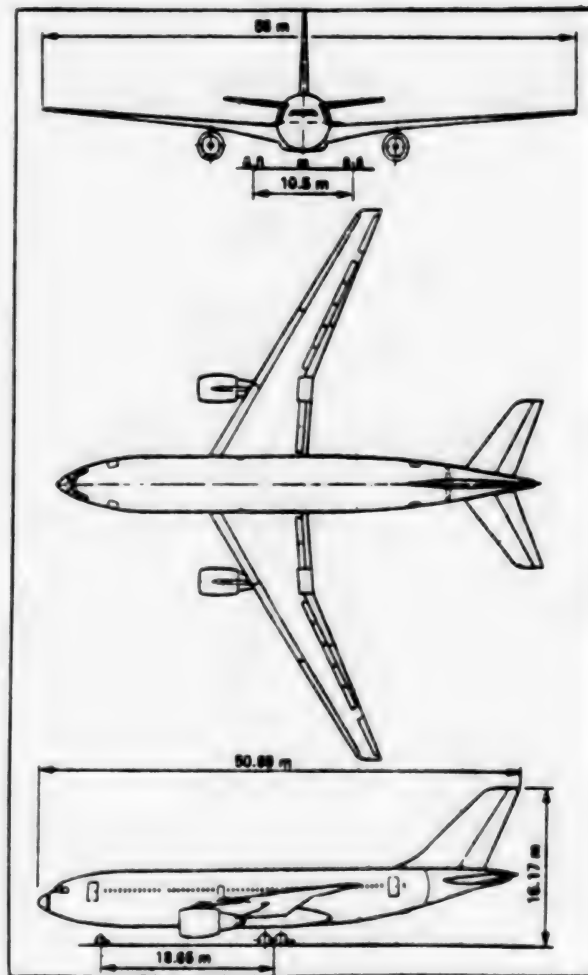
The big problem for the 150 seater is the availability of the engines. "We will not have a choice between three engines, but we will have at least one," Mr Beteille, the general manager of Airbus Industrie declared. He added: "we are confident we will have the engine we need in 1986." A statement which is intended as much to try and remove the doubts which exist about delays, as to indicate a desire not to dawdle with the program.

At the present time, 3 engines are contemplated, the CFM [expansion unknown] International (General Electric/Snecma) CFM 56-2000, the Rolls-Royce/JAEL [expansion unknown] (Japan) RJ 500-35, and the Pratt and Whitney/MTU [expansion unknown]/Fiat STF [expansion unknown] 633, all within the range of 24,000 to 25,000 pounds of thrust (10,886-11,340 kilograms thrust). On the technical level it is difficult to form an opinion about these various proposals so close as regards performance. In turn, one or the other is pictured as having the lead. What is certain that Rolls Royce, seriously affected by stopping production of the "Tristar," is going to concentrate its efforts to make its bid succeed. What seems probable, taking into account market prospects, risks and investments is that once a decision has been made, new associations will be formed on the level of the three large companies: CFM International, Pratt and Whitney and Rolls-Royce. What is also very probable is a delay of a few months which will lead, in fact, to putting the A-320 in service for the 1987 season.

Besides the A-310, A-300-600 and the A-320 three other plans are being studied:

A medium range twin jet liner with a very high capacity (350 seats in a single class) capable of covering 3,200 nautical miles (5,900 kilometers), the TA-9 (Twin Aisle-9);

A twin jet long-range liner capable of transporting 253 passengers in a similar arrangement over a range of 4,900 nautical miles (9,065 kilometers), called the TA-12;



The TA-12, twin engine long distance liner will be able to transport 230 to 250 passengers according to the arrangement, with a distance of 4,900 nautical miles between stops.

And finally a very long-range, four jet liner, with the same capacity as the TA-12, but able to cover 6,000 nautical miles (11,100 kilometers).

These 3 planes are based more or less directly on the A-300 and the A-310 and are to have in common a single wing surface of 320 square meters, representing an extension of 9.5.

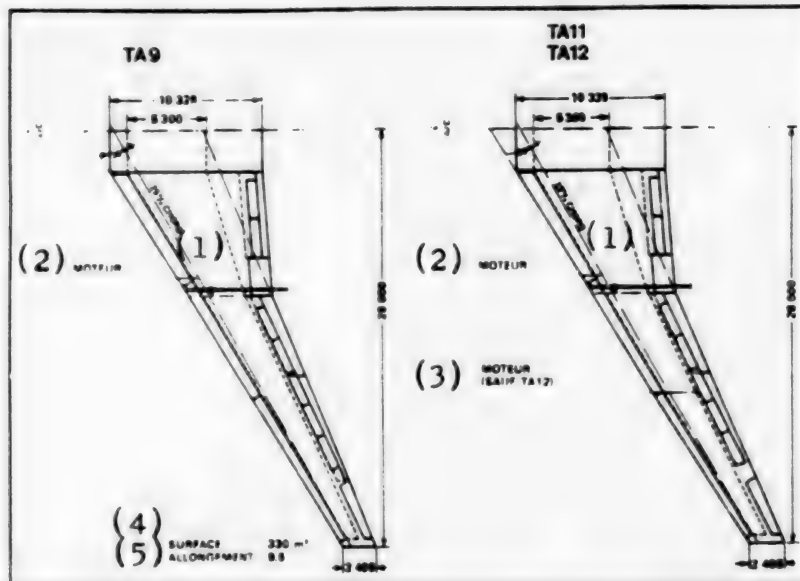
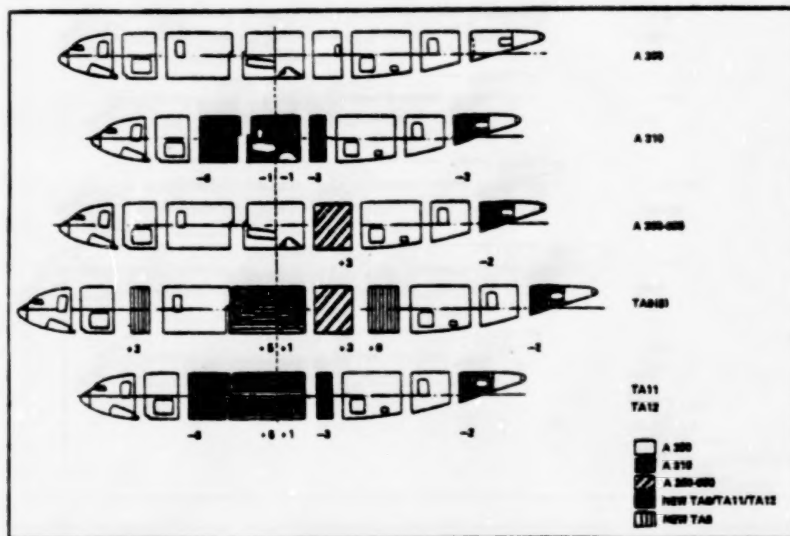


Diagram of the common wing assembly of the Airbus: On the left the twin engine model (the TA-9), on the right, the four engine model (the TA-11).

Key:

1. Chord
2. Engine
3. Engine (except TA-12)
4. Surface
5. Extension

Airbus Industrie, imitating Boeing, thus envisages creating a "basic design" which allows it to cover the broadest possible range of the market.



Based on the present A-300 fuselage, here are the models which Airbus Industrie is to develop for its various programs.

Alongside of these future projects which would have to run for the next 10 to 15 years, according to the outlets which the market will offer, Airbus Industrie intends to follow a policy of continuous improvement of its products.

Beginning in the next few years, test flights are to begin with rear centering on the A-300 No 3 which is now flying with the first cathode tube instruments. Flights with a centering of 42 percent of the chord have already been made. It is now a question of going to 45 percent in some flights. If, as those responsible for the test flights hope, the plane proves to be pilotable manually, a rear centering of 45 percent will be adopted on the A-300-600 and the A-310 when cruising. This centering will be obtained by transferring fuel in the tanks located in the horizontal plane of the tail unit. The advantage of this solution lies in a change of the plane's attitude in flight making it possible to reduce the tail's swerving and consequently to

reduce the compensating drag, which will improve fuel consumption. Piloting will be done with an automatic pilot, but the plane will remain pilotable manually long enough to make a reverse movement to return to a centering where the plane is naturally stable.

These projects should lead to two further developments. This method will be used first on the A-320 in a more complete manner, that is to say, that with the plane flying in an astable condition, the fin surface can be reduced, resulting in gains on the plane's drag and mass, with it all being piloted by electric flight commands. Then a version of the A-310 with an increased range is contemplated. Called the A-310-300, this version would have a range of 3,500 nautical miles (6,475 kilometers), would fly with a centering of 45 percent and would include fuel tanks on the horizontal plane. The solution will obviously be used again for the TA-9 and the planes which follow.

On the TA-9, for example, the combined effects of the solution will result in a fuel economy of about 2.5 percent.

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TRANSPORTATION

BRIEFS

BRITISH HIGH SPEED TRAIN--London--First commercial trip of the British TGV [Very High Speed] train--the British TGV, the APT [Advanced Passenger Train] made its first commercial trip on 7 December covering the 641 kilometers between Glasgow and London in 4 hours 14 minutes, at an average speed of 163 kilometers per hour. On the trip out the train arrived 1 minute ahead of schedule in the London station, after having reached 219 kilometers per hour at one point. The return was less triumphal: it arrived in Glasgow one-half hour late, because of defects in the inclination system, which is the most original feature of the APT. This device actually allows the train to lean on the many curves of the British railway network, until now an obstacle to increasing the speed of trains in Great Britain. Three times during the return trip, the defects in the inclination device caused a mini-panic among the passengers, overturning meal trays, spilling drinks and slamming the electronically closed doors. The APT project goes back to 1966, but the "BRITISH RAIL" budget delayed its completion. The passengers were delighted with the gain in time (an hour and a half over the regular train), but some found the APT uncomfortable. On 9 December, the APT had new technical breakdowns: it had to stop in the very middle of the Glasgow-London trip because of brake problems. The passengers were transferred to the regular train and the return trip was cancelled. [Text] [Paris AFP SCIENCES in French 10 Dec 81 p 41/ 8490

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